REMARKS

Claims 17-40 were pending in this application. Claims 17, 19, 25 and 27 are amended. No new subject matter is believed to have been added by these amendments. Therefore, claims 17-40 remain in this application.

35 U.S.C. § 102 Rejections

Claims 17-21, 24-29, 32-33, 36-37 and 40 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,095, 204 to Novini (hereinafter "the Novini patent"). In view of the above amendments and the following remarks, the Applicants respectfully request reconsideration of this rejection.

As set forth in independent claim 17, the present invention is directed to a method of imaging a liquid-filling container, comprising the steps of: emitting and irradiating light onto the container by a light emitting unit, receiving the light transmitted through the container by a light receiving unit, and imaging inside of the container based on information about the transmitted light, wherein the light emitting unit emits and irradiates a near infrared light with a wavelength of 700 to 900 nm as the light for imaging inside of the container, and the container is one of a colored container and a container having a frost surface.

As set forth in independent claim 19, the present invention is also directed to a method of emitting and irradiating light onto the container by a light emitting unit, receiving the light transmitted through the container by a light receiving unit, and imaging inside of the container based on information about the transmitted light, wherein the light receiving unit receives a near infrared light with a wavelength of 700 to 900 nm as the light for imaging inside of the container, and the container is one of a colored container and a container having a frost surface.

As set forth in independent claim 25, the present invention is further directed to an apparatus for imaging a liquid-filling container, comprising: a light emitting unit for emitting and irradiating light onto the container, and a light receiving unit for receiving the light transmitted through the container, wherein the light emitting unit emits and irradiates a near infrared light with a wavelength of 700 to 900 nm as the light for imaging inside of the

container, and the container is one of a colored container and a container having a frost surface.

As set forth in independent claim 27, the present invention is also directed to an apparatus for imaging a liquid-filling container, comprising: a light emitting unit for emitting and irradiating light onto the container, and a light receiving unit for receiving the light transmitted through the container, wherein the light receiving unit receives a near infrared light with a wavelength of 700 to 900 nm as the light for imaging inside of the container, and the container is one of a colored container and a container having a frost surface.

The Novini patent discloses a system and method for optical inspection of the bottom surfaces of transparent containers. The system includes an illumination source 40 and an image acquiring means 30 configured for optically inspecting a bottom face of a transparent glass container 24. The illumination source 40 is a solid state LED strobe light that provides a visible beam (see column 8, lines 53-56). The system disclosed in the Novini patent is intended for the inspection of a bottom surface of a transparent container (see column 6, line 4). Such inspection yields detection of structural defects on the bottom surface 22 of the container such as foreign objects, cracks, bubbles, holes and improper dimensions (see column 8, lines 14-15).

There are a variety of differences between the Novini patent and the claimed invention of the instant application. First, the Novini patent does not teach or suggest imaging the inside of a colored container or a container having a frost surface as required by the independent claims. The Novini patent clearly describes that the system is for "inspecting the bottom surface of transparent containers" (see column 6, line 4). Furthermore, the Novini patent only discloses inspecting the bottom surface of the container for structural defects such as foreign objects, cracks, bubbles, holes and improper dimensions (see column 8, lines 14-15). The Novini patent does not teach or suggest imaging the inside of the container to determine the fill content of the container or the presence of any foreign substance within the container as required by the independent claims.

The Novini patent also employs a strobe illumination source 40, which is a visible beam. The reference further discloses that, if desired, UV, infrared, red, blue, green or polarizing filters can be attached to the front of the illumination source 40. However, the use of such filters is to "improve the contrast of the image or enable the system to detect particular colors" (see column 9, lines 50-56). The Novini patent, however, fails to teach or suggest a near infrared light with a wavelength of 700 to 900 nm as the light for imaging inside of a colored container or a container having a frost surface as required by the independent claims. Since the Novini patent uses a visible light source, the transmittance of the visible beam when imaging a colored container or a container with a frost surface would decrease, thus making the detection of a defect inside the container difficult. Furthermore, although the Novini patent suggests the use of an infrared filter with illumination source 40, the purpose of such a filter is to improve the contrast of the image or enable the system to detect particular colors, not for the detection of the inside of the container as required by the independent claims.

For the foregoing reasons, the Applicants believes that the subject matter of independent claims 17, 19, 25 and 27 is not anticipated by the Novini patent Reconsideration of the rejection of claims 17, 19, 25 and 27 is respectfully requested.

Claims 18, 20, 21, 24, 26, 28, 29, 32, 33, 36, 37 and 40 depend from and add further limitations to independent claims 17, 19, 25 and 27 and are believed to be allowable for the reasons discussed hereinabove in connection with independent claims 17, 19, 25 and 27. Reconsideration of the rejection of claims 18, 20, 21, 24, 26, 28, 29, 32, 33, 36, 37 and 40 is respectfully requested.

35 U.S.C. § 103 Rejections

Claims 22, 23, 30, 31, 34, 35, 38 and 39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Novini patent in view of U.S. Patent No. 5,523,560 to Manique et al. (hereinafter "the Manique patent"). In view of the above amendments and the following remarks, the Applicants respectfully request reconsideration of this rejection.

Claims 22, 23, 30, 31, 34, 35, 38 and 39 depend from and add further limitations to independent claims 17, 19, 25 and 27. The Novini patent was discussed hereinabove in connection with independent claims 17, 19, 25 and 27. The Manique patent discloses the step of detecting an amount of liquid in a liquid-filled container. However, the Manique patent further discloses that the liquid-filled container is a container that is transparent to electromagnetic radiation (see the Manique patent: column 8, lines 2-5). The present claimed invention, on the other hand, requires that the container is a colored container or a container with a frost surface. This allows the system of the present invention to determine that a foreign substance is inside a colored or frosted container using a near-infrared beam with a predetermined wavelength when attenuation in the transmittance is observed. Therefore, the Manique patent does not cure the deficiencies of the Novini patent.

Claims 22, 23, 30, 31, 34, 35, 38 and 39 are believed to be patentable for the reasons discussed hereinabove. Reconsideration of the rejection of claims 22, 23, 30, 31, 34, 35, 38 and 39 is respectfully requested.

Double Patenting Rejections

Claims 17-40 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 6,753,527 to Yamagishi et al. (hereinafter "the Yamagishi patent"). In view of the above amendments and the following remarks, the Applicants respectfully request reconsideration of this rejection.

The Yamagishi patent is directed to a method and device for imaging liquid-filling containers using a plurality of imaging devices each including a light emitting unit and a light receiving unit. The reference further describes the use of cut filters and infrared light. The wavelengths of the lights emitted by the light emitting units differ from each other. This prevents light irradiated from a certain light emitting unit from entering a further light receiving unit that does not correspond thereto. Thus, two or more kinds of conditions relating to the liquid filled container can be imaged simultaneously and reliably.

The Examiner states that although the conflicting claims are not identical, they are not patentably distinct from each other because the invention disclosed in the present application and the claims in the patent are obvious variants over each other. The Examiner states that the only difference is a plurality of imaging devices which would be at least obvious, if not inherent.

The Yamagishi patent does not claim that the container is one of a colored container and a container with a frost surface or that the system is for imaging inside the container as required by the independent claims of the present application. Instead, the primary purpose of the Yamagishi patent is to avoid interference of one imaging unit from noise generated by another imaging unit. Therefore, the present claimed invention differs from the claims in the Yamagishi patent, and the present claimed invention is not an obvious variation of the claimed invention in the Yamagishi patent.

Therefore, claims 17-40 are believed to be patentable for the reasons discussed hereinabove. Reconsideration of the rejection of claims 17-40 is respectfully requested.

CONCLUSION

Based on the foregoing amendments and remarks, reconsideration of the rejections and allowance of pending claims 17-40 are respectfully requested.

Respectfully submitted,

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